

A New Species of *Polyalthia* (Annonaceae) from China

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ABSTRACT. The new species *Polyalthia zhui* X. L. Hou & S. J. Li, found from Hainan and southern Guangdong in southern China, is described and illustrated. It has previously been confused with *Polyalthia nemoralis* A. DC. or *P. littoralis* (Blume) Boerlage in China, but is distinguished on the basis of its green fleshy ovate petals, outer petals spreading ca. 4×2.5 mm, inner petals not fully spreading, somewhat bent to the inside, ca. $5-6 \times 4-4.2$ mm, 1 mm thick or more, its carpels pilose only in the lower half, and its non-lobed stigma.

Key words: Annonaceae, China, *Polyalthia*.

Polyalthia Blume, with 150 to 160 species, is the largest annonaceous genus in Asia (Van Heusden, 1992). Its species are mainly distributed in tropical Asia, New Guinea, Australia, the Solomon Islands, Fiji, Madagascar, and East Africa (Van Heusden, 1992; Verdcourt, 1971) and are especially numerous in Southeast Asia (Sinclair, 1955). There are 32 species in Singapore (Sinclair, 1955), 27 in Vietnam (Ban, 2000), 7 in Sri Lanka (Huber, 1985), and 8 in Burma (Kurz, 1974). The northern distribution edge of *Polyalthia* is in southern China; there are 17 spe-

cies in Guangdong, Guangxi, Yunnan, and Hainan Provinces (Tsiang & Li, 1979).

The systematics of Annonaceae from China is the first author's Ph.D. thesis, and the present paper is a part of this study. In the last three years, nearly all Annonaceae herbarium collections in China (about 10,000 sheets) were checked, and several field investigations were carried out concurrently.

At the South China Institute of Botany (IBSC), we found that some specimens cited as *Polyalthia nemoralis* A. DC. by Merrill and Chun (1940) were heterogeneous with the others, i.e., *How* 70423 (IBSC), *Lau* 2843 (IBSC), *Liang* 66027 (IBSC), *Liang* 62116 (IBSC), *Liang* 62794 (IBSC), *Liang* 63904 (IBSC), *Liang* 66500 (IBSC), *Tso & Chun* 44581 (IBSC), *Tso & Chun* 44717 (IBSC). We temporarily regarded them as doubtful specimens for lacking flowers, and we did not confirm they are our new species, *P. zhui*, until we had observed the flowers of the *Hainan Western Expedition* 264 (IBSC). Its outer petals are ovate, 4×2.5 mm, its inner petals are ovate, $5-6 \times 4-4.2$ mm, 1 mm thick or more, pubescent outside, while *P. nemoralis* petals are oblong, 8×4 mm, only 0.4 mm

Table 1. Morphological comparison of *Polyalthia nemoralis* and *Polyalthia zhui*.

	<i>Polyalthia nemoralis</i>	<i>Polyalthia zhui</i>
Petals	White, densely pubescent outer side, chartaceous, less than 0.4 mm thick, oblong; inner petals 8 mm long	Green, pubescent outer side, fleshy, 1 mm thick or more, ovate-rounded; inner petals 5-6 mm long
Stamens	Connective apex convex, densely puberulent	Connective apex slightly concave, nearly glabrous
Ovaries	Densely gray pubescent, stigma bifid	Pilose only in the lower half, stigma unlobed
Fruit walls	Coherent with seeds	Separate from seeds
Leaf blade veins	Secondary veins incurved; intersecondary veins absent; veinlets unbranched; tracheids 0.3-0.5 mm	Secondary veins straight; intersecondary veins 6 to 8 pairs; veinlets 1- or 2-branched; tracheids less than 0.1 mm
Leaf	Length : width = 2.5-3 : 1	Length : width = 3-3.6 : 1

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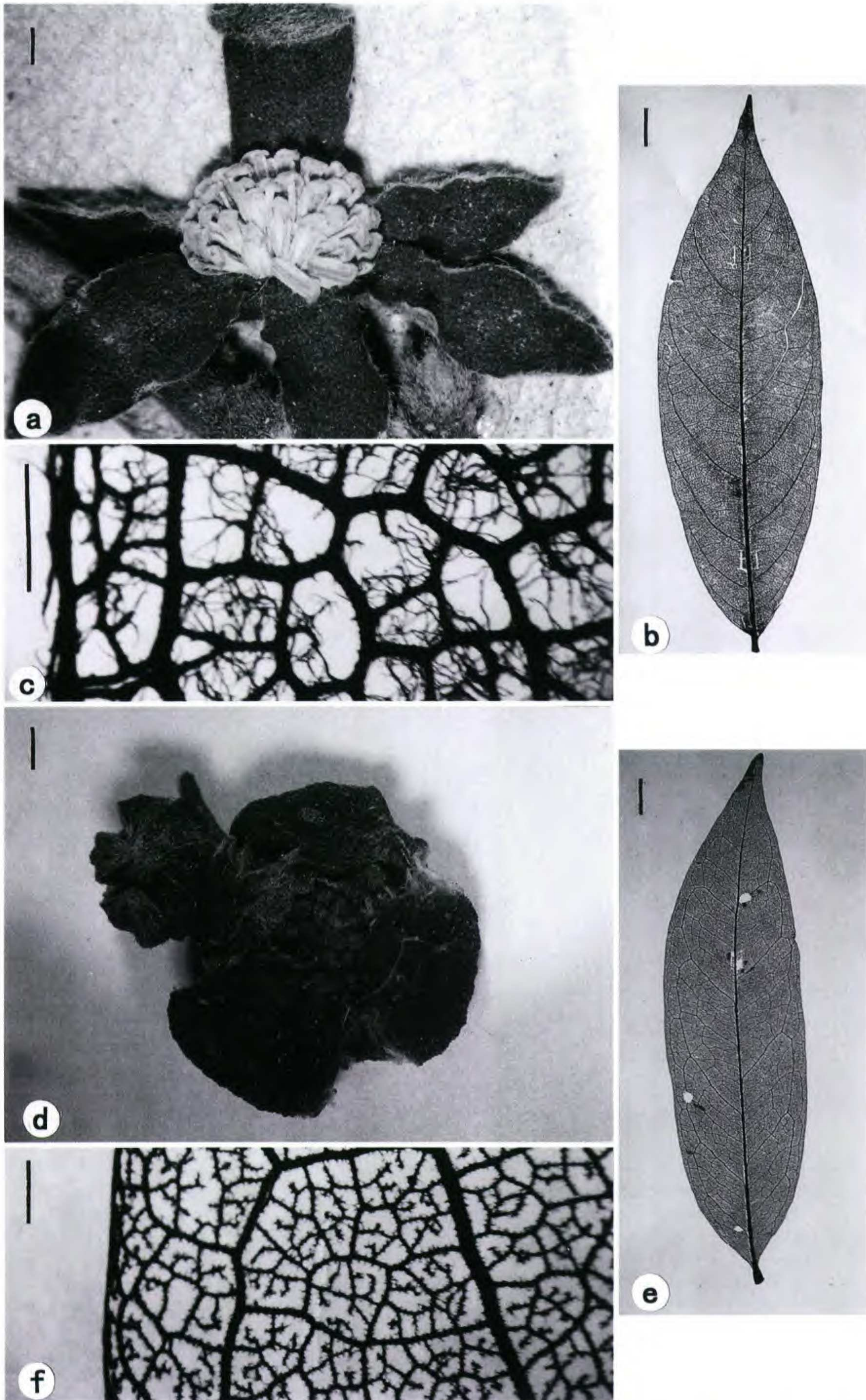


Figure 1a–c. *Polyalthia nemoralis* (from H. R. Liang 61573, IBSC). —a. Flower. —b. Leaf venation. —c. Leaf venation magnified. d–f. *Polyalthia zhui* X. L. Hou & S. J. Li (from the holotype, Hainan Western Expedition 264, IBSC). —d. Flower. —e. Leaf venation. —f. Leaf venation magnified. Scale bars: a, c, d & f = 1 mm; b & e = 1 cm.

Table 2. Morphological comparison of *Polyalthia littoralis* and *Polyalthia zhui*.

	<i>Polyalthia littoralis</i>	<i>Polyalthia zhui</i>
Ratio of inner petal length to outer petal length	2–2.6 : 1	1.4–1.6 : 1
Petal texture	thin-membranous	fleshy, 1 mm thick or more
Ratio of monocarpel length to the stalk of monocarpel length	2–3.1 : 1	4–5 : 1
Length of monocarpel stalk	3–6 mm	3 mm
Length of fruiting peduncles	ca. 12 mm	3–4 mm
Leaf blade	lanceolate, usually 2–3 cm wide	oblong-lanceolate or ovate-lanceolate, usually 3.5–4.2 cm wide

thick, and pilose outside. Further observation shows that these specimens also differ from *P. nemoralis* in carpels, fruit, stamens, and leaf venation (Table 1, Fig. 1).

After having compared the specimens with the known species of *Polyalthia* recorded in various floras and systematic treatments (Blume, 1830; Hooker & Thomson, 1855, 1872; Merrill, 1912, 1923; Sinclair, 1955; Backer & Bakhuizen, 1963; Huber, 1985; Ban, 2000), we found a few species with petals less than 10 mm long. Among these,

only *P. littoralis* (Blume) Boerlage, whose distribution extends to Indonesia and Vietnam, is similar to *P. zhui*. We made sure, however, that *P. zhui* was distinct from *P. littoralis*. *Polyalthia littoralis* petals are thin-membranous, whereas *P. zhui* petals are thick-fleshy up to 1 mm or more. Furthermore, the two species can be distinguished by their leaves, monocarpels, and fruiting peduncles (Table 2). *Polyalthia littoralis* was reported as new to China by Li (1993). According to the specimens cited by Li (1993), however, his *P. littoralis* was Merrill and Chun's *P. nemoralis*, that is, it included *P. nemoralis* and *P. zhui*.

Polyalthia zhui X. L. Hou & S. J. Li, sp. nov.
TYPE: China. Hainan: Danzhou City, Nada, Lianchangjiaoyuan, 15 May 1954, *Hainan Western Expedition 264* (holotype, IBSC; isotypes, IBK, KUN, PE). Figures 1D–F, 2, 3.

Affinis *Polyalthiae nemoralis*, sed floribus ca. 6 mm diam., petalis exterioribus ovato-rotundis 4 mm longis, 2.5 mm latis, petalis interioribus ovato-rotundis, 5–6 mm longis, 4–4.2 mm latis, externis rare pubescentibus, carpellis meris pubescentibus in dimidio inferiore, stigmatibus non lobato, connectivo parum concavo differt.

Shrubs usually 1.5–3 m, rarely up to 5 m tall; bark dark brown; young twigs dark purple, striate, pubescent with appressed gray-yellow hairs, but quickly glabrescent. Leaves coriaceous, oblong-lanceolate or ovate-lanceolate, 9–16(–19) × 2.5–4.5(–5) cm, apex acuminate to obtuse-acuminate, base cuneate, glabrous, dark green above, lucid and pale green beneath, midrib slightly grooved above and obviously convex beneath, secondary veins 8 to 10 pairs, at 60° to 80° with the midrib, interarching 3–5 mm from the margin, reticulations somewhat prominent on both sides, intersecondary veins in 6 to 8 pairs; petioles 3–5 mm long, yellowish, rugose. Inflorescences extra-axillary with 1 (or 2) flowers; peduncles ca. 1 mm long; pedicels

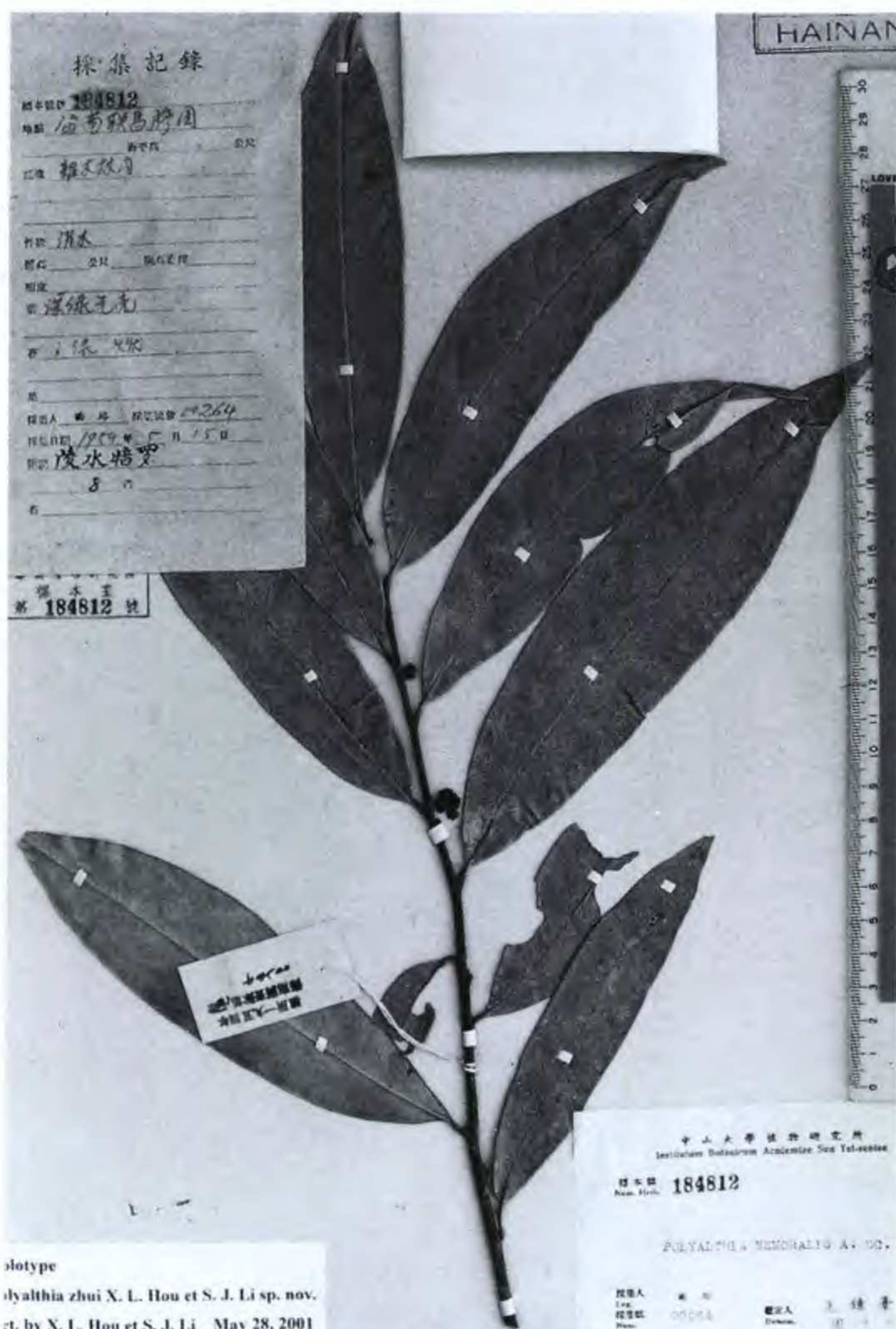


Figure 2. Holotype of *Polyalthia zhui* (Hainan Western Expedition 264, IBSC).

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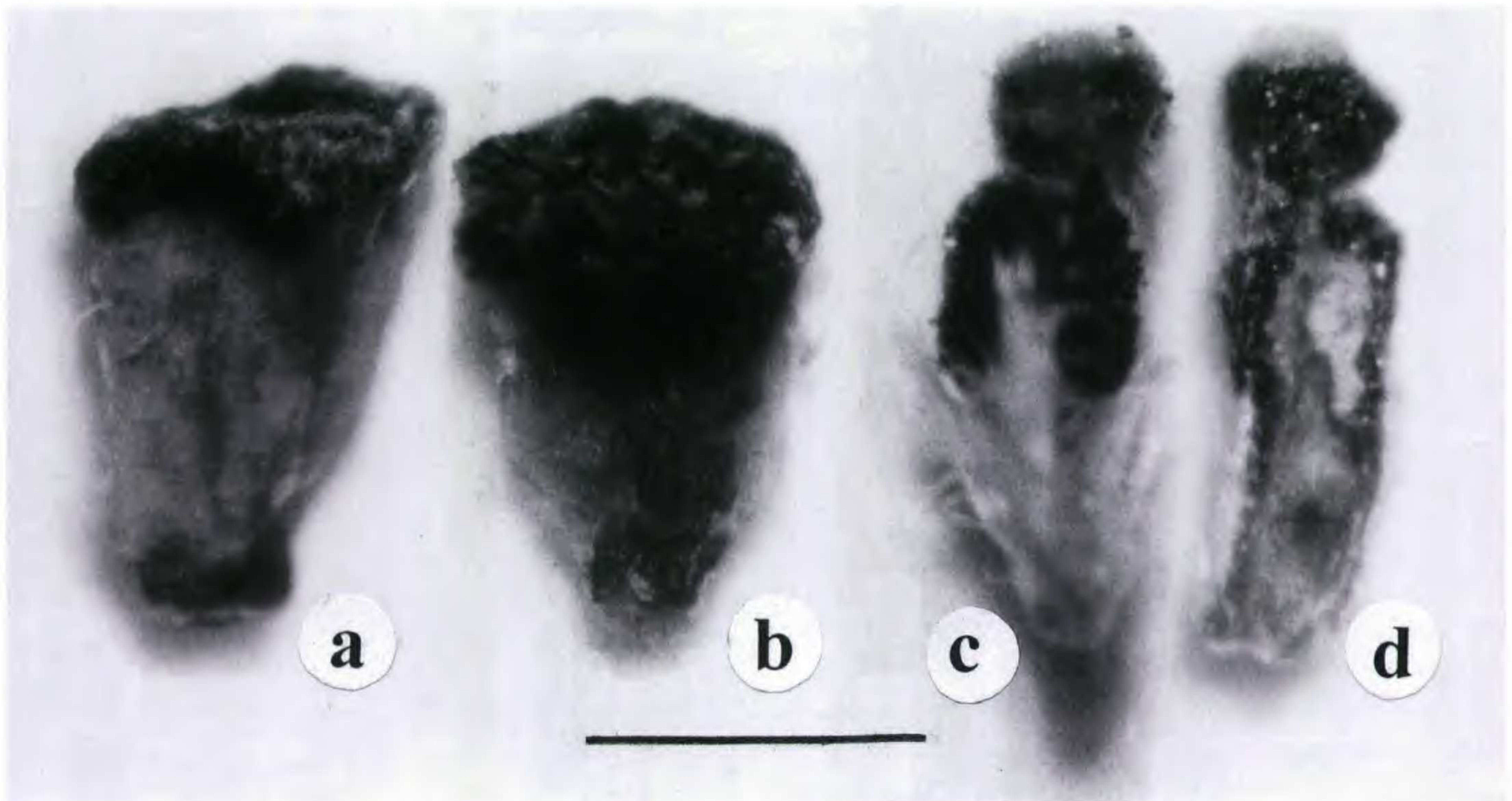


Figure 3. *Polyalthia zhui*. —a. Abaxial view of stamen. —b. Adaxial view of stamen. —c. Carpel. —d. Longitudinal section of carpel. Scale bar = 1 mm. (From the holotype, *Hainan Western Expedition 264*, IBSC.)

1–2 mm long, pubescent with gray-yellow hairs, bract 1, broadly ovate, 1–2 × 2 mm, acuminate. Flower green, ca. 6 mm diam. when mature; sepals connate at base, lobes 3, ovate, 2 × 1.8 mm, pubescent outside, glabrous inside, persistent; petals 6 in 2 whorls, fleshy, acute, pubescent outside, glabrous inside, outer petals ovate, flat, spreading, ca. 4 × 2.5 mm, inner petals ovate, flat, not fully spreading, somewhat bent to inside, 5–6 × 4–4.2 mm, ca. 1 mm thick or more; stamens ca. 50 to 100, cuneate, 1–1.3 mm long, ca. 1 mm wide, connective apex slightly concave, dark purple, glabrescent; carpels ca. 30, with one basal ovule each, 1.5–2 mm long, pilose with brown-yellow hairs in the lower half; stigma capitate, sessile, puberulent, not lobed. Monocarpels 4 to 7 (to 11), ellipsoid, 12–15 mm long, 8–10 mm diam., purple-red when dry, glabrous, densely tiny-dotted, stalks 3 mm long, pubescent; seed 1 per locule, ellipsoid, red, 10–12 mm long, 6–8 mm diam., separated from fruit walls, endosperm ruminative.

Distribution and habitat. In wet forest at 250–600 m, Hainan and southern Guangdong. In forest edges, sometimes along small streams. This was collected in flower April through July and in fruit July through February of the following year.

Polyalthia zhui is distinguished from the other species of *Polyalthia* by its oblong-lanceolate or ovate-lanceolate leaf shape, lucid and pale green beneath and 6 to 8 pairs of intersecondary veins, its relatively short pedicels and small green flowers

with fleshy petals, its nearly glabrous and slightly concave connective apices, its capitate stigma, and its seeds not adherent to fruit walls.

Eponymy. *Polyalthia zhui* was named in honor of our master supervisor, Prof. Zhu Changshan, working in the Henan Agriculture University, who shared his rich knowledge of and correct methods for studying plant taxonomy.

Paratypes. CHINA. **Guangdong:** Xuwen Co., Mailao-wo village, 31 Oct. 1951 (fr), *Z. S. Zhu 1036* (IBSC); Xuwen Co., Kengzai village, 26 Apr. 1936 (fr), *Hainan Southern Expedition 391* (IBK, IBSC, KUN, PE); Xuwen Co., Xuwenshan hill, near Yugonglou, 27 Sep. 1951 (fr), *S. H. Chun 7515* (IBSC); Xuwen Co., Guocheng village, 7 Nov. 1957 (fr), *Hainan Southern Expedition 152* (IBSC); Xuwen Co., Baishui village, 15 Apr. 1985 (fl), *Li & Xing 1985* (IBSC). **Hainan:** Baisha Co., a valley near Hongmaodong, 27 Apr. 1936, *S. K. Lau 26534* (IBSC, KUN); Baoting Co., Diaoluoshan Mountain, Baishuilong, 24 Nov. 1954, *Diaoluoshan Expedition 2815* (IBK, IBSC, PE); Changjiang Co., Jiaqieshan hill, 16 Oct. 1933 (fr), *S. K. Lau 2843* (A, IBSC); Changjiang Co., 20 Dec. 1933 (fr), *H. R. Liang 66027* (A, IBK, IBSC); Changjiang Co., Dec. 1933 (fr), *H. R. Liang 66102* (A, IBK, PE); Changjiang Co., 20 Dec. 1933 (fr), *H. R. Liang 66500* (IBK, IBSC, PE); Dongfang Co., Guangba District, Qicha, 17 Nov. 1956, *S. H. Chun 11134* (IBSC); Dongfang Co., Maanling, 6 Nov. 1978, *G. A. Fu 1391* (IBSC); Dongfang Co., Jianfengling, near Sanmojue village, 23 Mar. 1934, *S. K. Lau 3533* (SYS), *S. K. Lau 4924* (IBSC); Dongfang Co., *H. R. Liang 63094* (A, IBK, IBSC); Ledong Co., Taohui village, Taohuilong, *S. K. Lau 27454* (A, IBK, IBSC, KUN, PE); Lingshui Co., Nanwanling, 21 Jan. 1985, *G. A. Fu 5551* (IBSC); Sanya City, Nanshanling, 30 Dec. 1932, *Tso & Chun 44717* (A, IBK, IBSC, PE); Sanya City, Nanshanling, 26 Dec. 1932, *Tso & Chun 44581* (A, IBK, IBSC,

PE); Sanya City, Xiaobaokang, 16 July 1933 (fr), *H. R. Liang* 62116 (A, IBK, IBSC, PE); Sanya City, Daposhan hill, 23 Aug. 1933, *H. R. Liang* 62794 (A, IBK, IBSC); Sanya City, Yanglin, 24 Mar. 1933, *F. C. How* 70423 (IBSC); Sanya City, Ganzhaling, upriver Fotian Reservoir, 30 Oct. 1987, *Z. X. Li* 3058 (IBSC); Sanya City, Dabao-kang, 16 July 1933, *C. Wang* 33087 (IBSC, PE); Sanya City, Nanlin, Guikaishan hill, 16 Oct. 1933 (fr), *C. Wang* 34633 (IBSC).

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